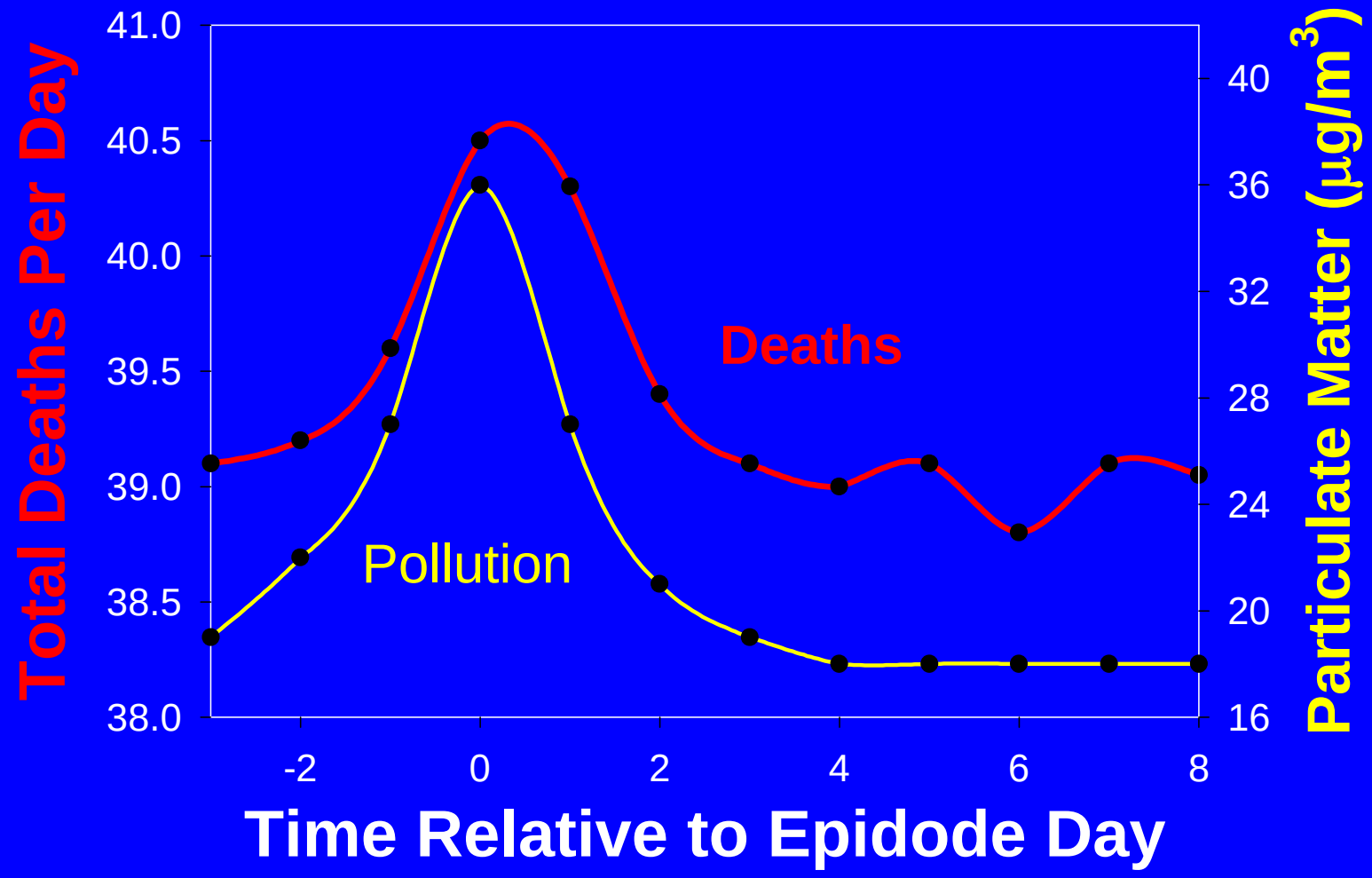
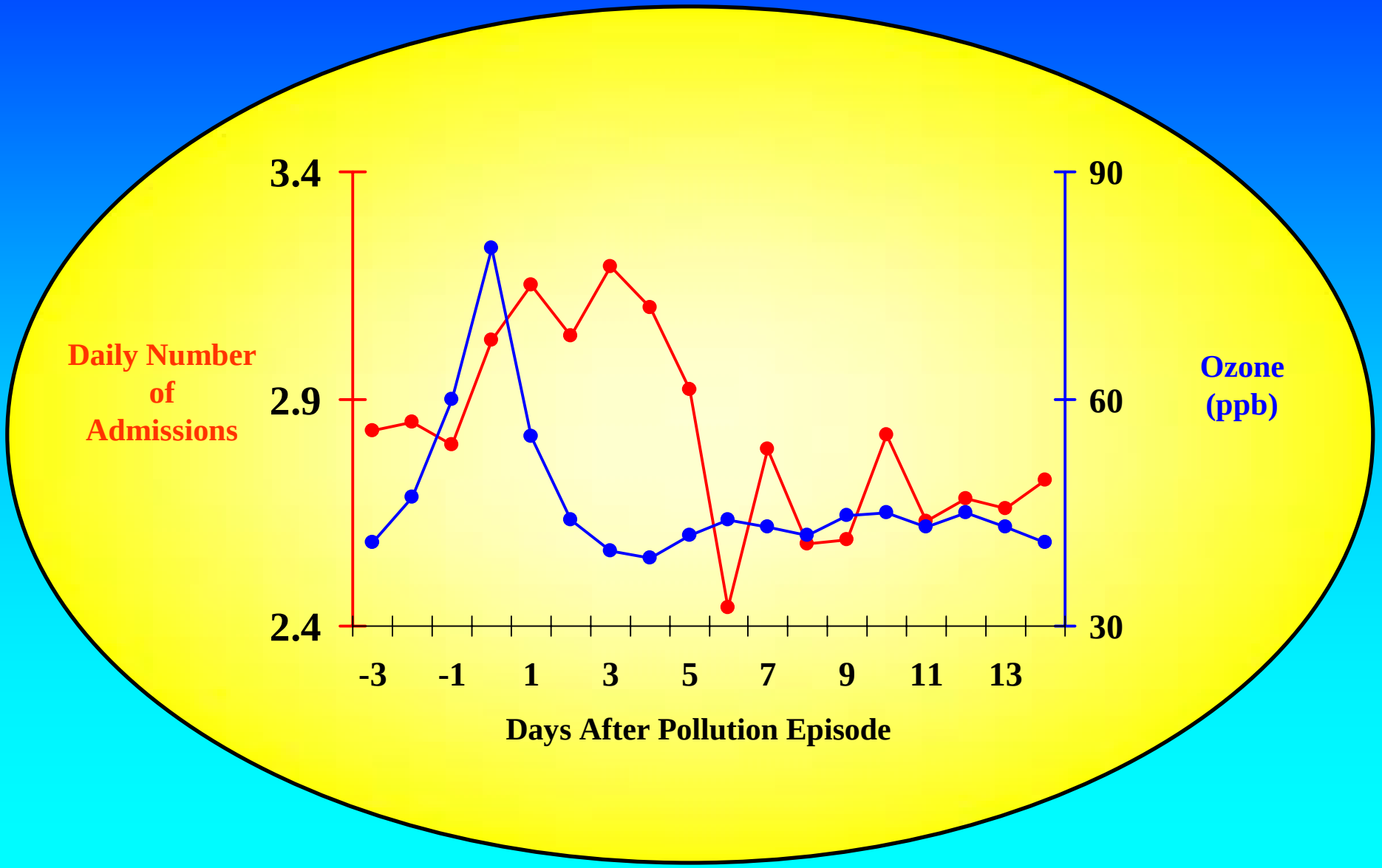
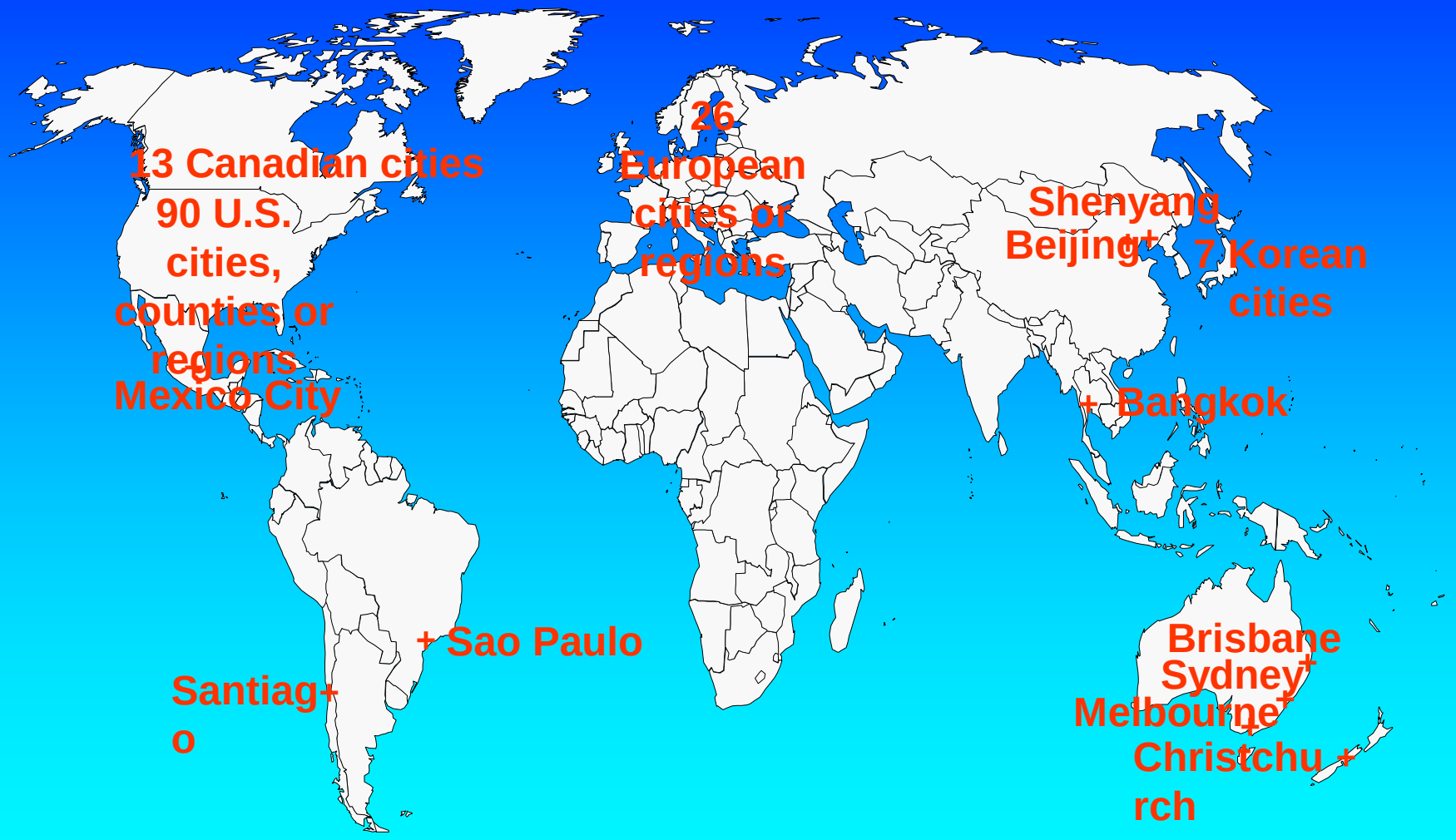
Effect of Pollution Episode (Toronto, Canada)



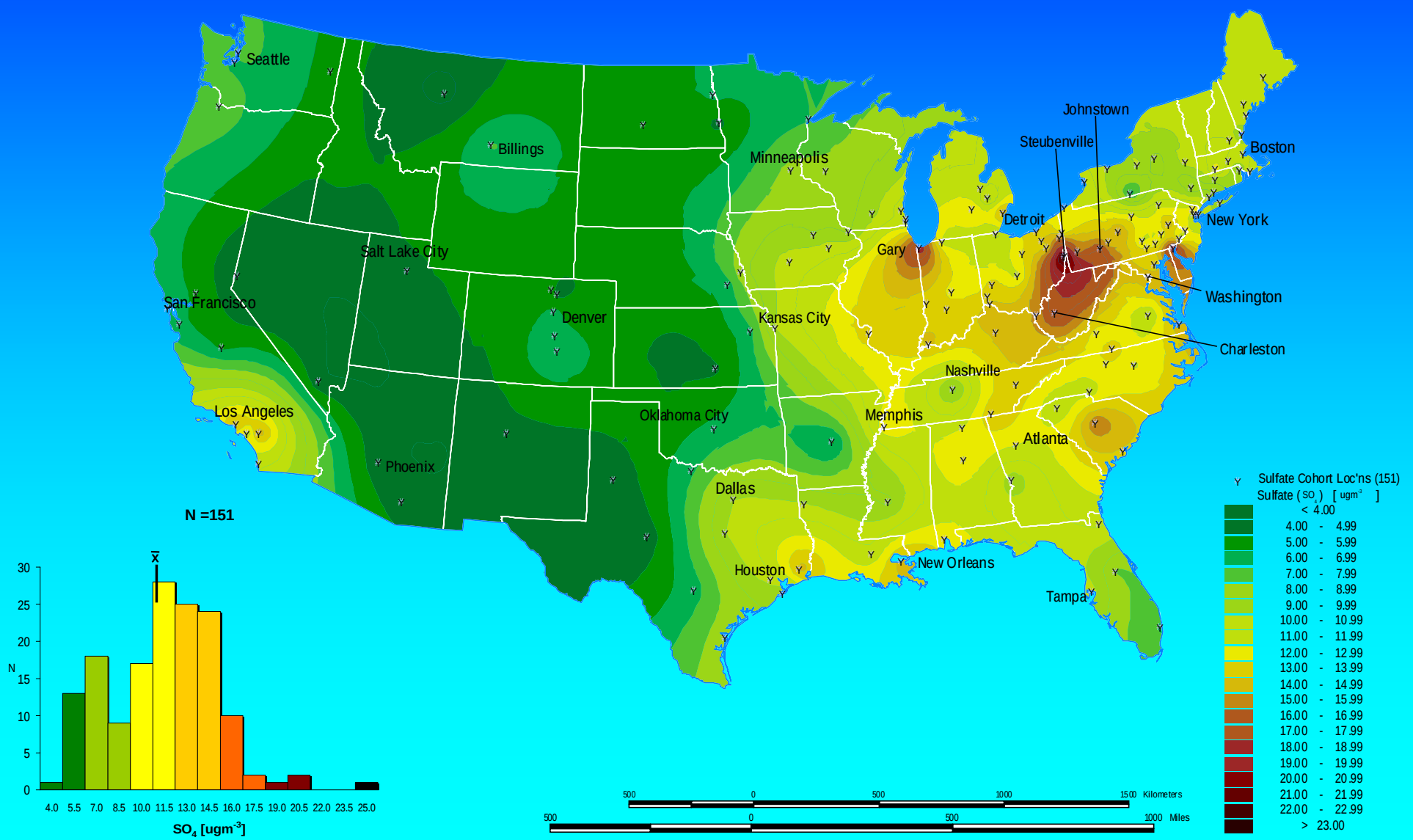
Ground Level Ozone and Infant Respiratory Health



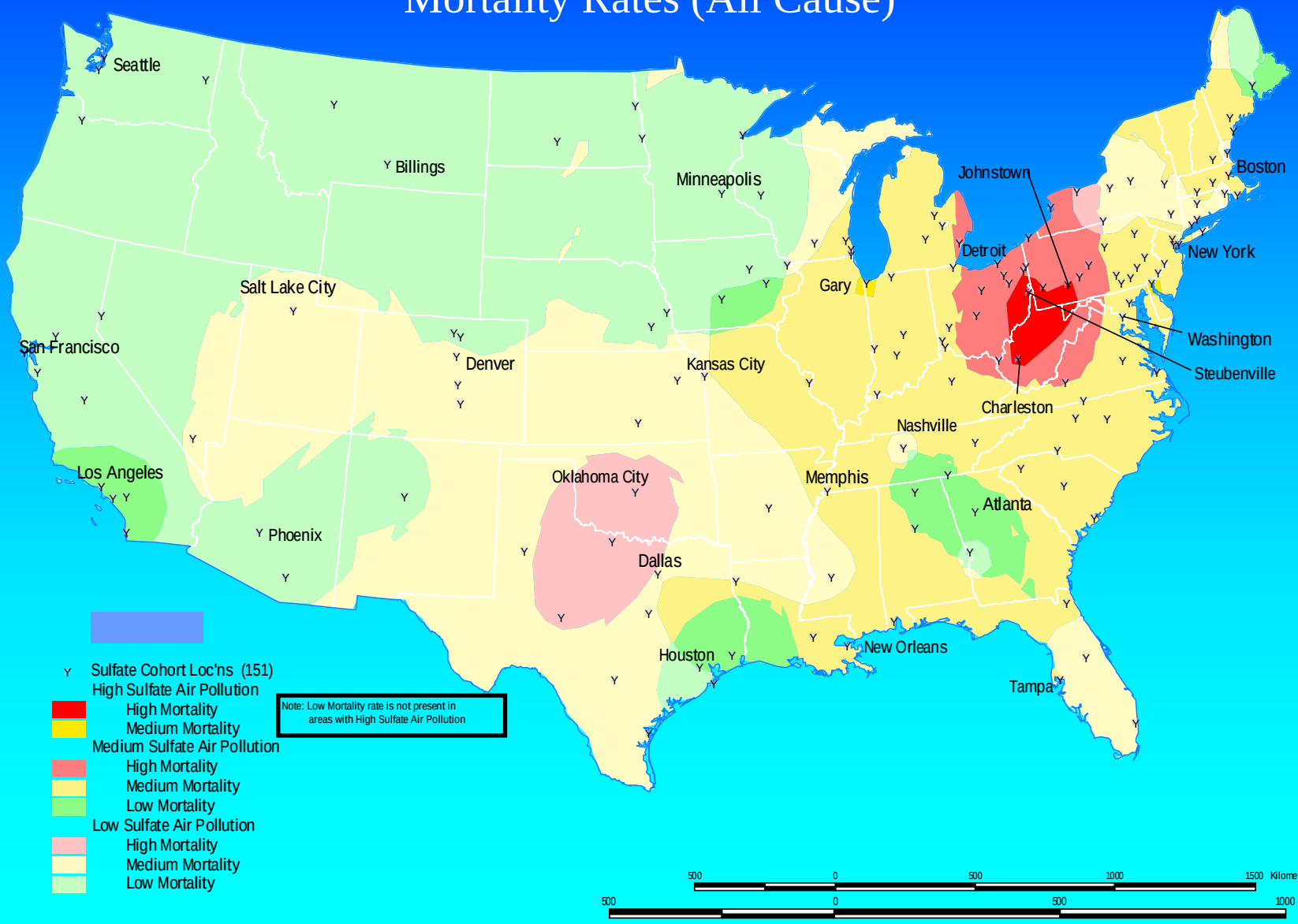


Location of studies of air pollution and mortality

Modeled (Kriged) Sulfate (SO_4) Surface

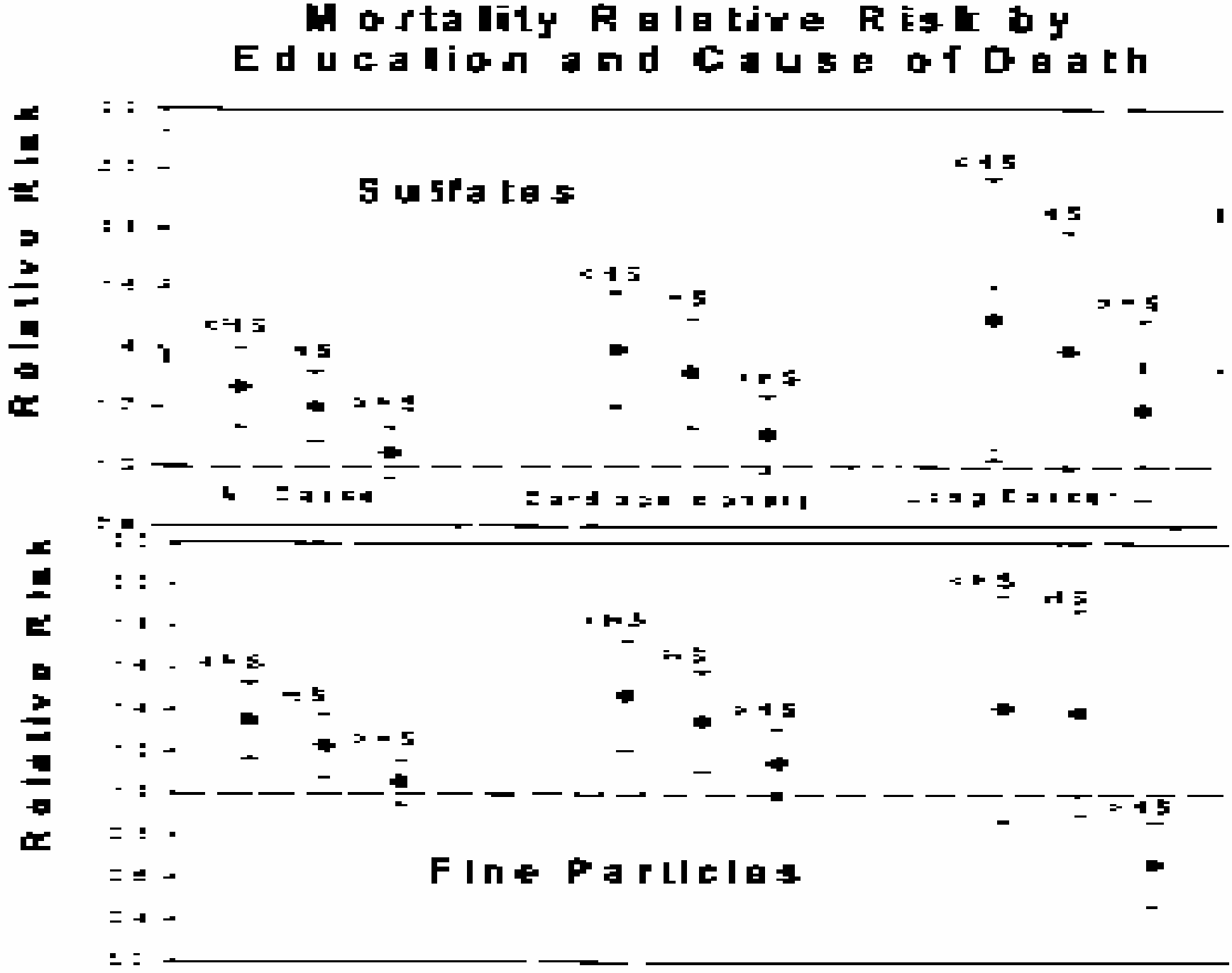


Sulfate (SO_4) Air Pollution Levels
and
Mortality Rates (All Cause)

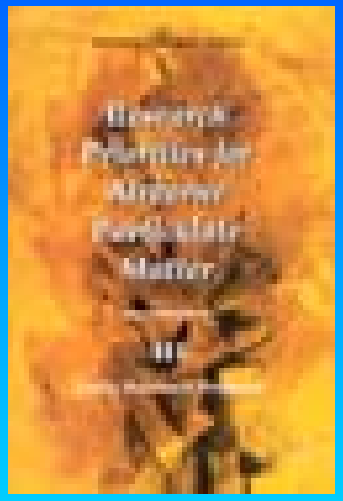


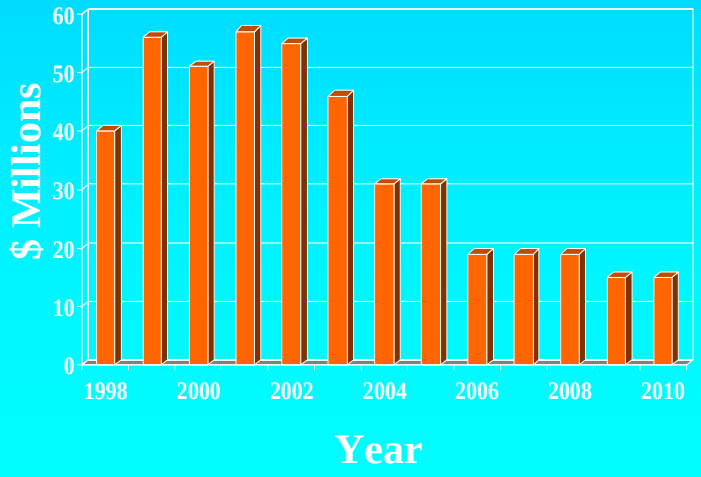
American Cancer Society Study

Cause of Death	RR PM2.5	RR SO4
All-cause	1.17 (1.09, 1.26)	1.15 (1.09, 1.22)
Cardiopulmonary	1.31 (1.17, 1.46)	1.26 (1.16, 1.37)
Lung cancer	1.03 (0.80, 1.33)	1.36 (1.17, 1.66)


Mortality Relative Risk by
Education and Cause of Death
Relative Risk
Sulfates
Fine Particles

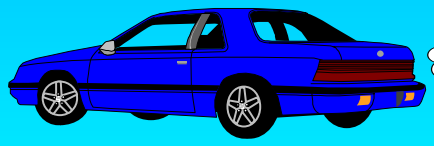
U.S. National Academy of Sciences Research Priorities for Airborne Particulate Matter (1998 - 2010)





Evidence to Policy: Sulfur in Gasoline

Canadian average sulphur level is 360 ppm



Model changes in emissions

Sulphates

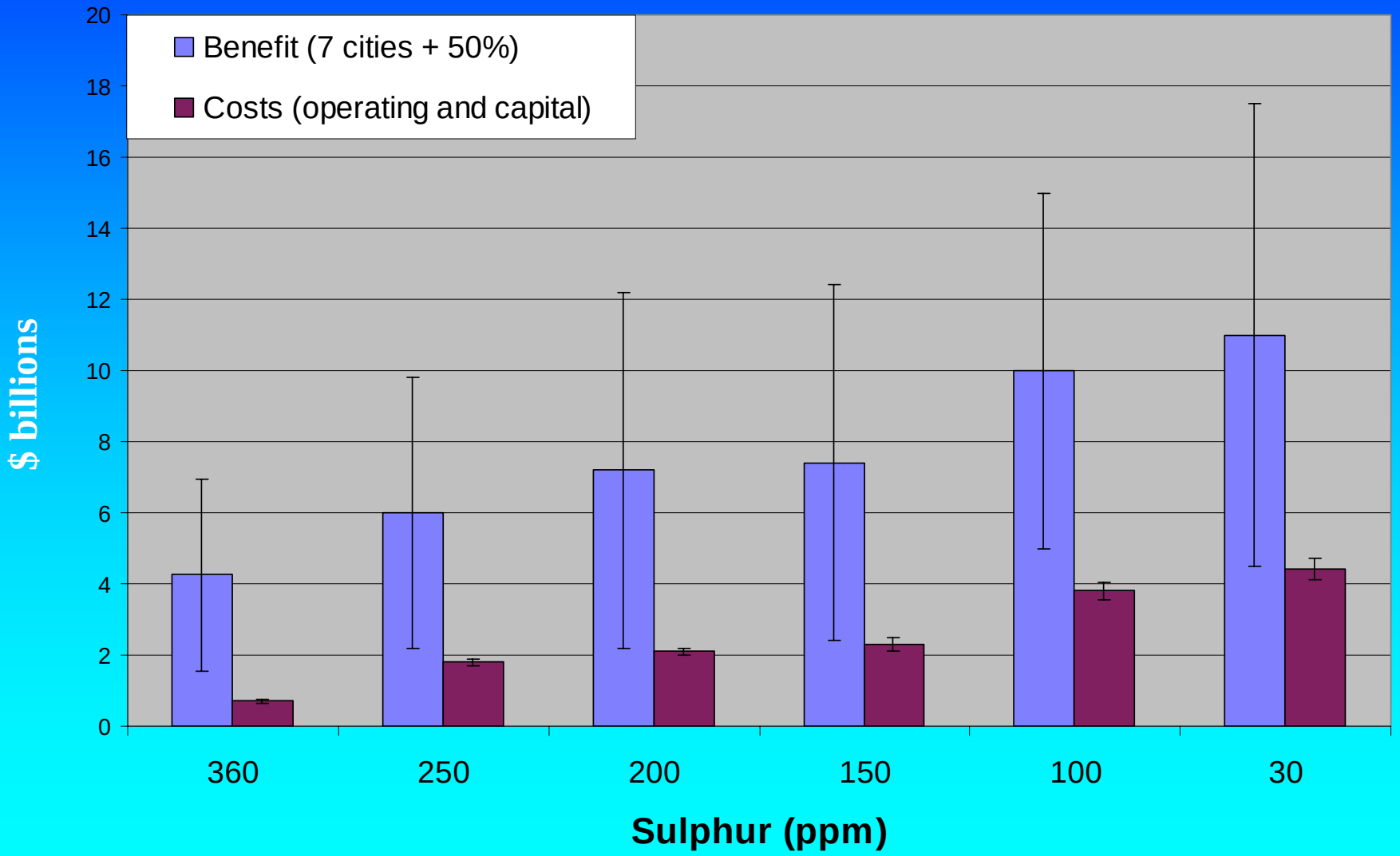
Model changes in ambient air concentrations of pollutants

Model changes in human exposure

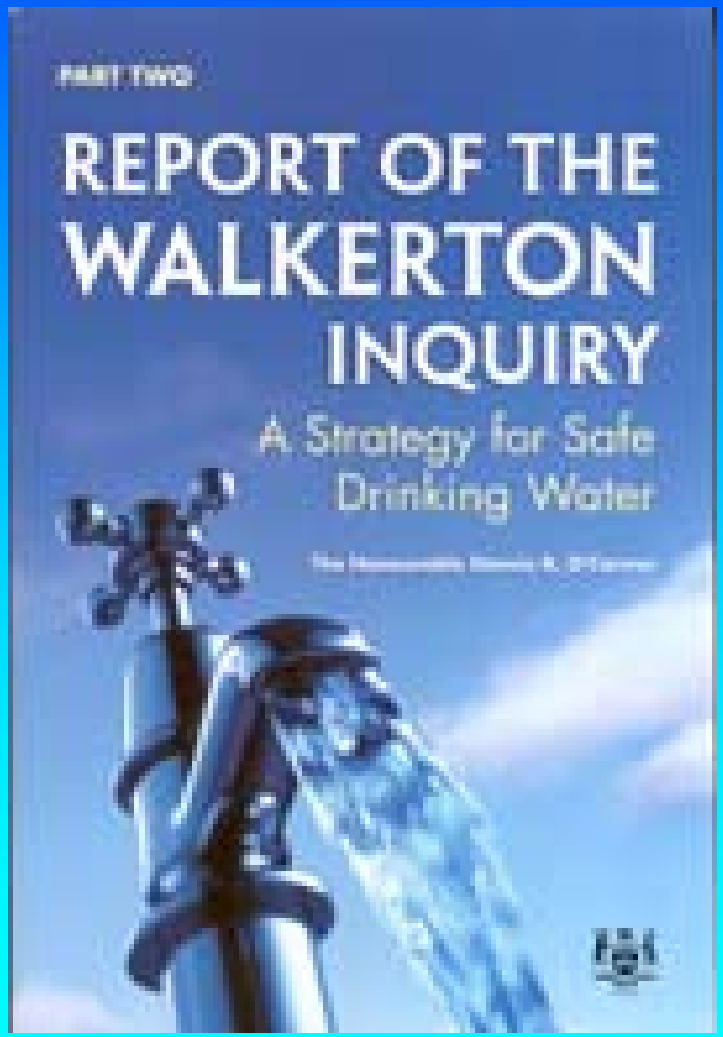
Model changes in health effects

Model value of health benefits and societal costs

Benefits and Costs of Low Sulfur Gasoline



Water Quality



Micro-organisms and Human Health

- **Viral Microbes (**primarily cause enteric disease and stem from faecal contamination**)**
  - *Caliciviruses: Norwalk virus*
  - *Enteroviruses: polioviruses, coxsackieviruses and echoviruses*
  - *Hepatitis Viruses*
  - *Rotaviruses*
- **Bacteria (**well known to cause waterborne infection with varying symptoms**)**
  - *Campylobacter jejuni*
  - *Aeromonas*
  - *Legionallea*
  - *Pathogenic Escherichia coli (E.Coli)*
  - *Salmonella*
  - *Shigella*
  - *Vibrio cholerae*
  - *Yersinia Enterocolitica*

Multi-barrier Approach to Drinking Water Risk Management

- **Source Protection:**

  No matter how pristine the source is, contaminants will enter.

- **Treatment:**

  There will be some failures in any system.

- **Distribution Systems:**

  Recontamination can occur after treatment.

- **Monitoring:**

  Early discovery of system failure is vital to limiting adverse effects.

- **Emergency Response:**

  Effective and timely notification will reduce casualties when failures have occurred.

Recommendations to Walkerton Inquiry

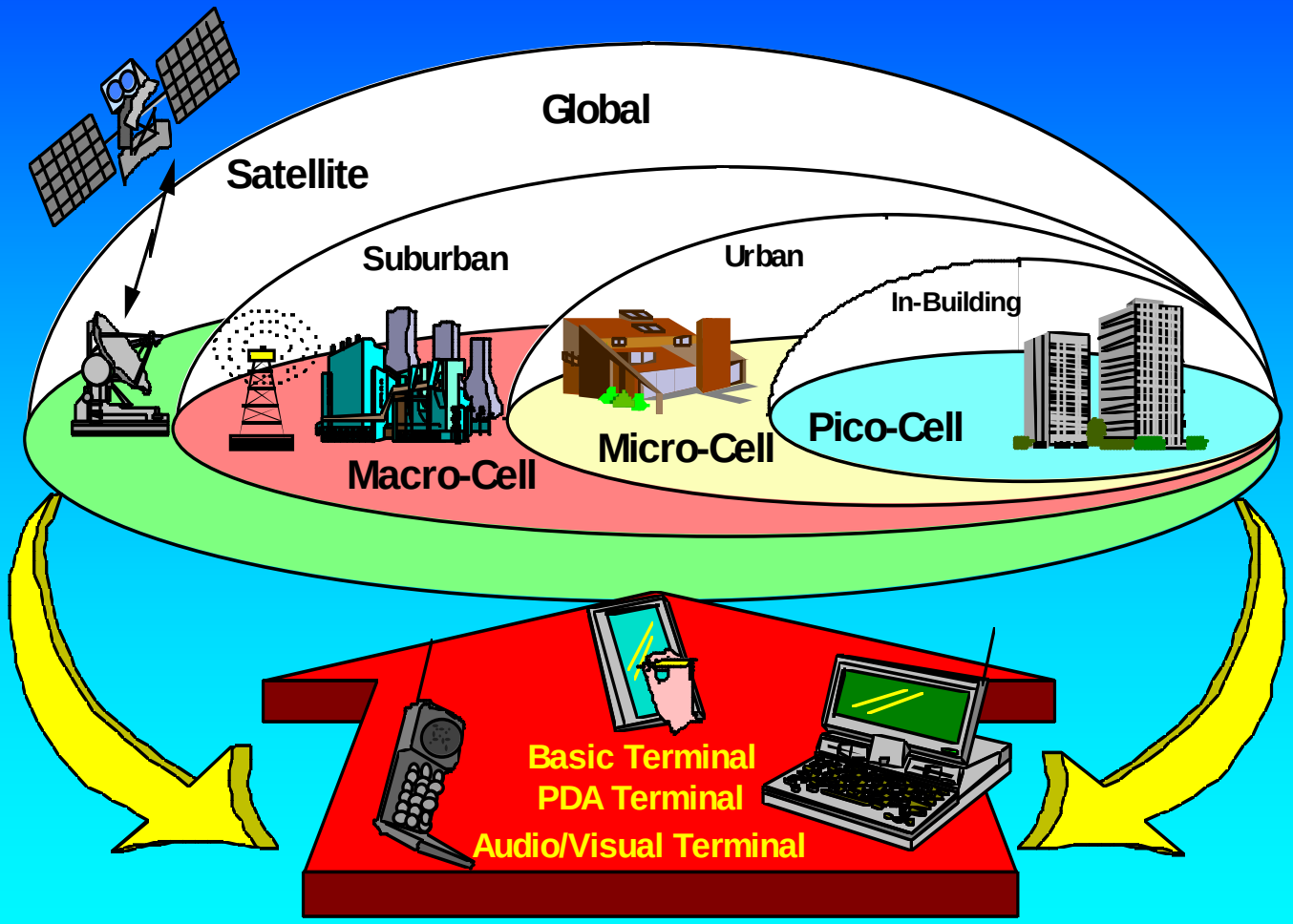
(Krewski, Balbus, Butler-Jones, Haas, Isaac-Renton, Stewart, 2002)

- **Enhanced population health surveillance**
- **Scientific methods for characterizing microbiological risks**
- **Source water protection**
- **Total water quality management**
- **Minimization of risk**

Radiofrequency Fields

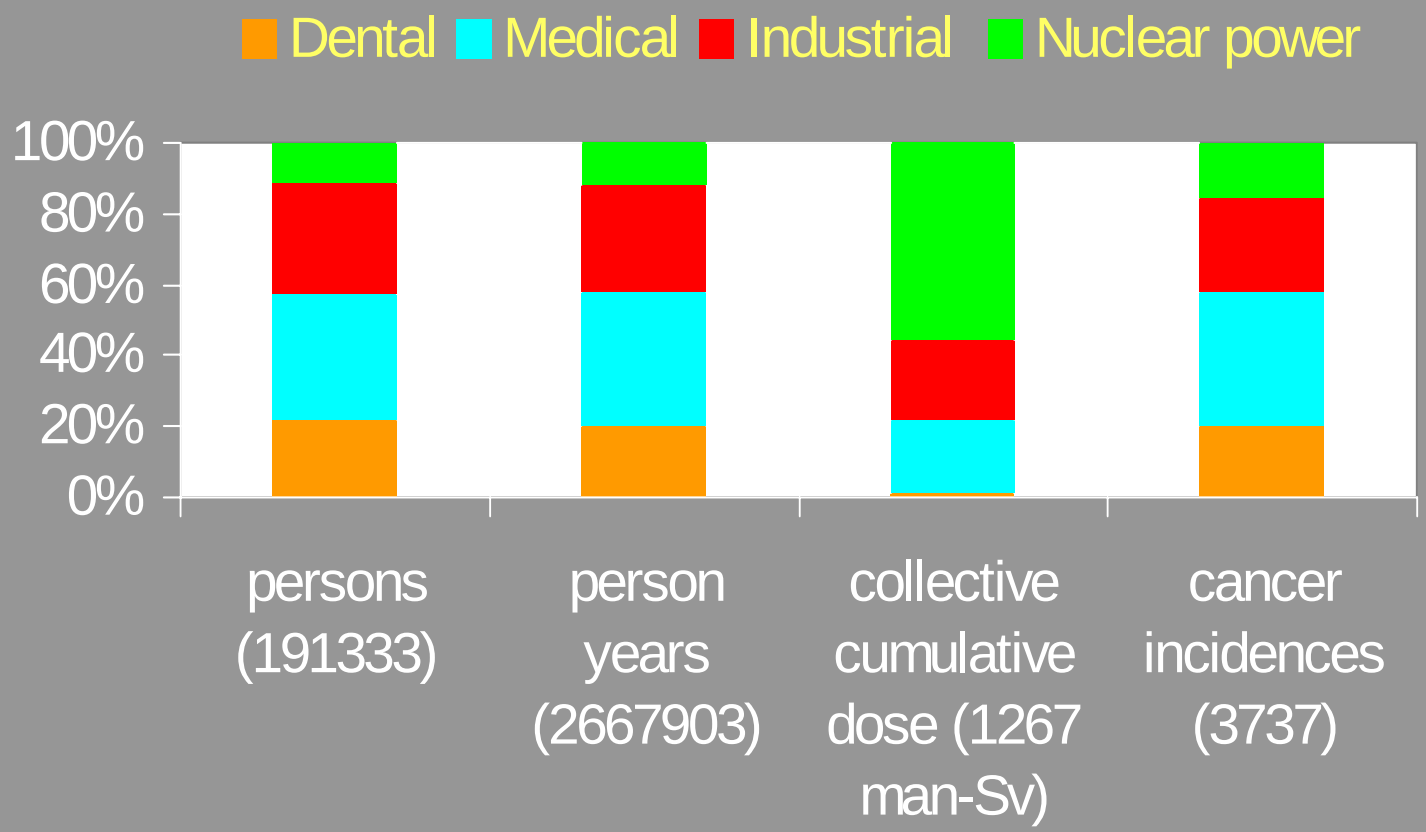
http://www.rsc.ca

21st Century Vision

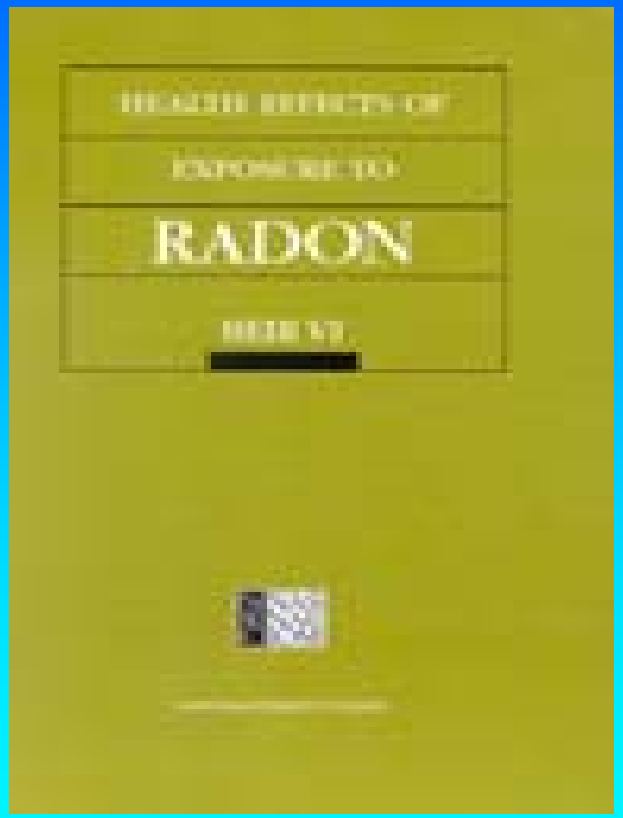


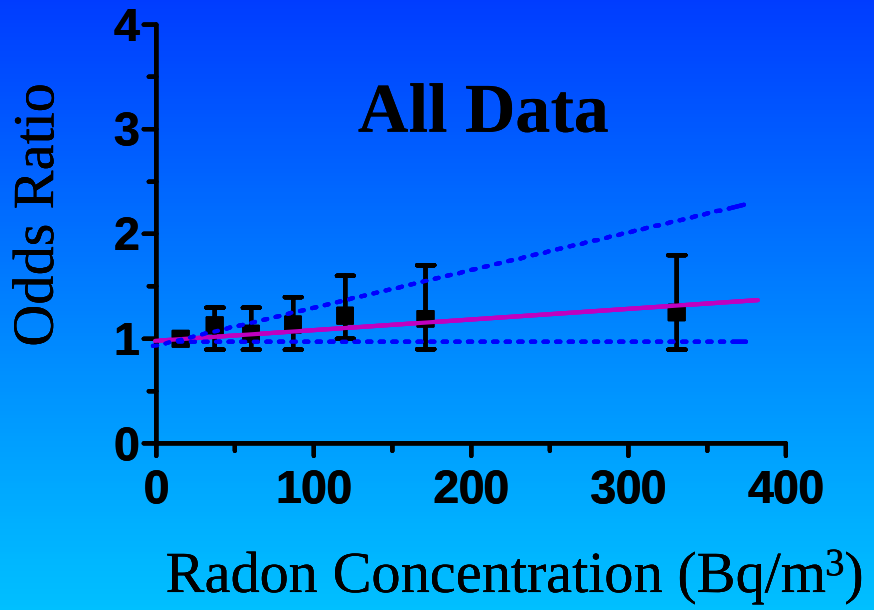
Flexible, Multi-Functional Network

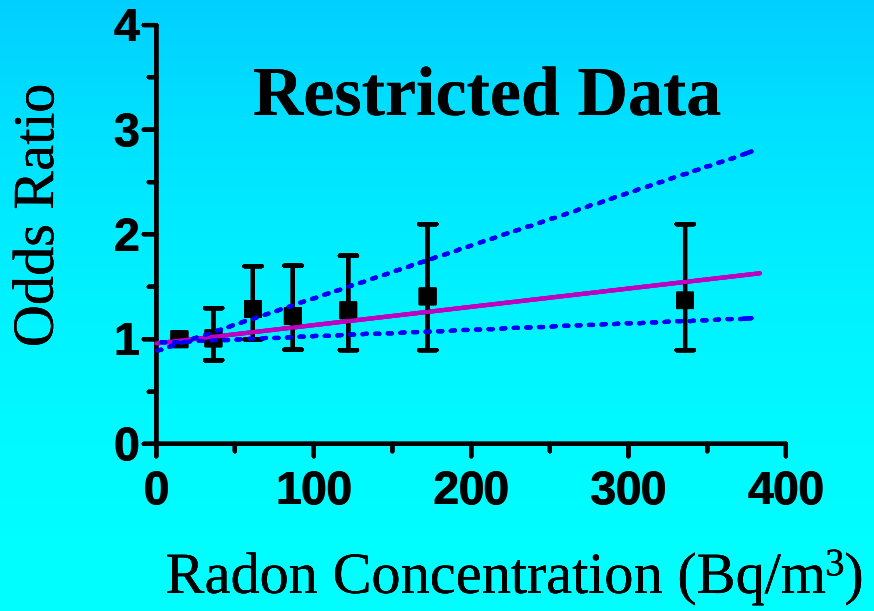
National Dose Registry of Canada



Residential Radon and Lung Cancer

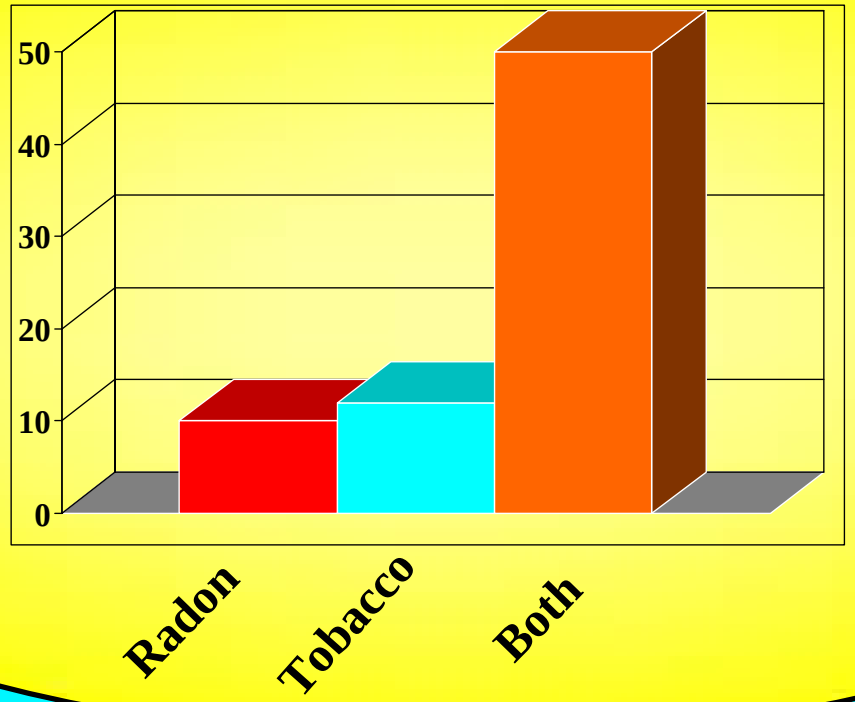


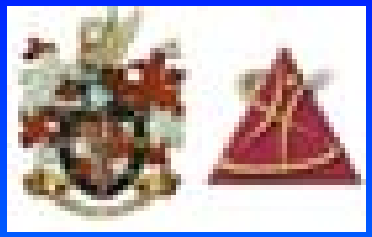




Synergism Between Radon and Tobacco in Lung Cancer Risk in Uranium Miners

Relative Risk of Lung Cancer





The preferred source of information and commentary on endocrine modulation

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Endocrine disruptor:

“An exogenous agent that interferes with the synthesis, secretion, transport, binding, action or elimination of natural hormones in the body that are responsible for the maintenance of homeostasis, reproduction, development and/or behaviour” (USEPA 1997)

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Health Concerns

Endocrine active compounds (EACs) have been linked to a wide variety of adverse health concerns in humans.

- breast cancer
- endometrial cancers
- endometriosis
- fecundity and fertility
- increased rates of spontaneous abortion
- sex ratios
- testicular cancer
- ovarian cancer
- prostate cancer
- declining semen quality
- male reproductive tract abnormalities
- precocious puberty

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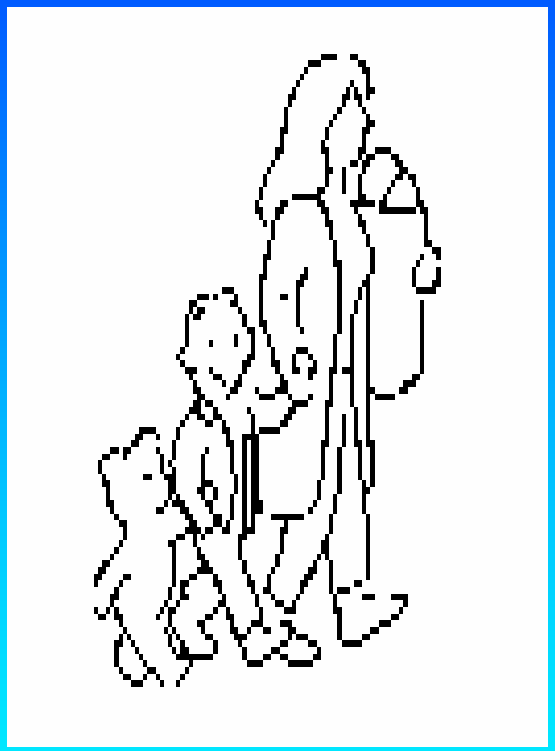
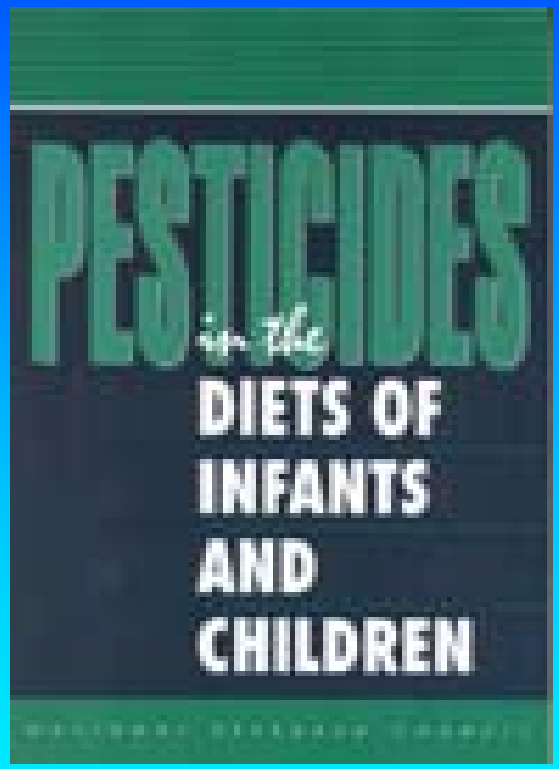
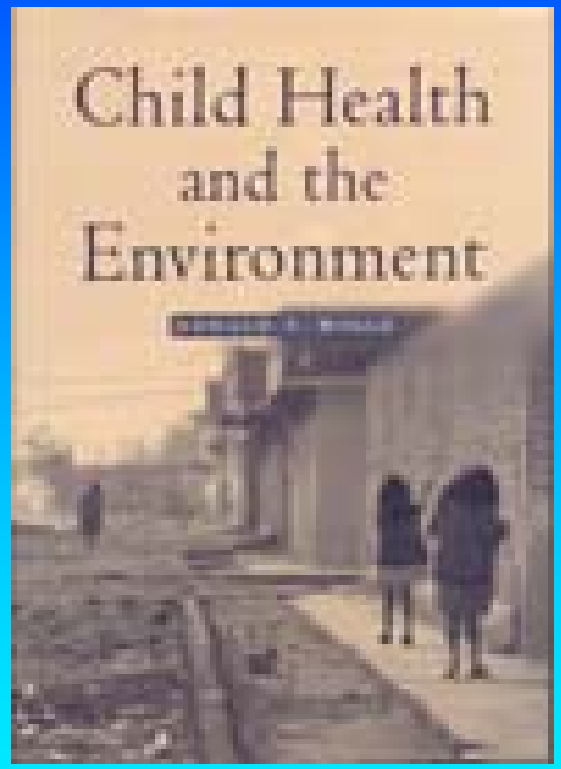
Children's Environmental Health







"Kids are not just little people."
-Globe & Mail (1995)

CEH Issues Identified by 6 or More Agencies*

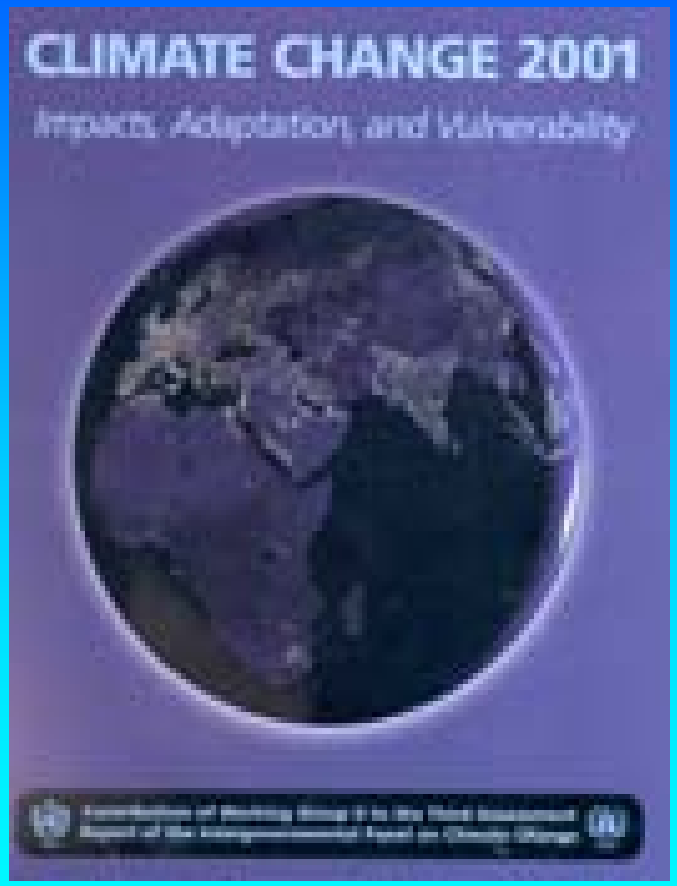
- **Asthma**
- **Air quality - indoor, outdoor**
- **Lead**
- **Pesticides**
- **Water quality - microbes, chemicals**

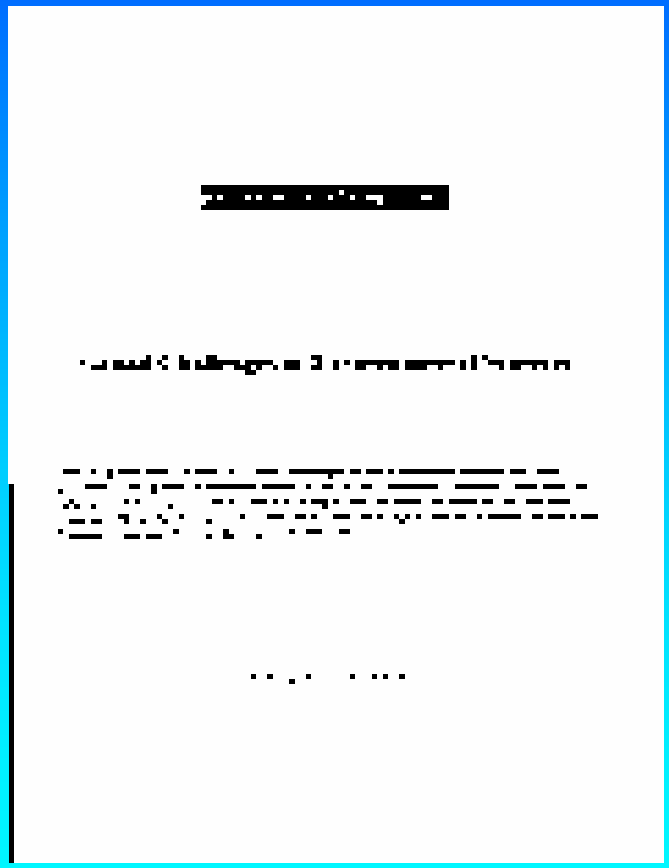
*** WHO, ECEH, CEPIS, G8, CEC, EPA, NCEH, Healthy People, CSTE**

Trichinella nativa Contamination in Walrus

- **Rate: ≈ 6% of total harvest (1996-2001)**
- **Levels: 0.2 to 76.9 lpg in tongues**
- **2 to 6 times less concentrated in intercostals and pectorals**

Global Change

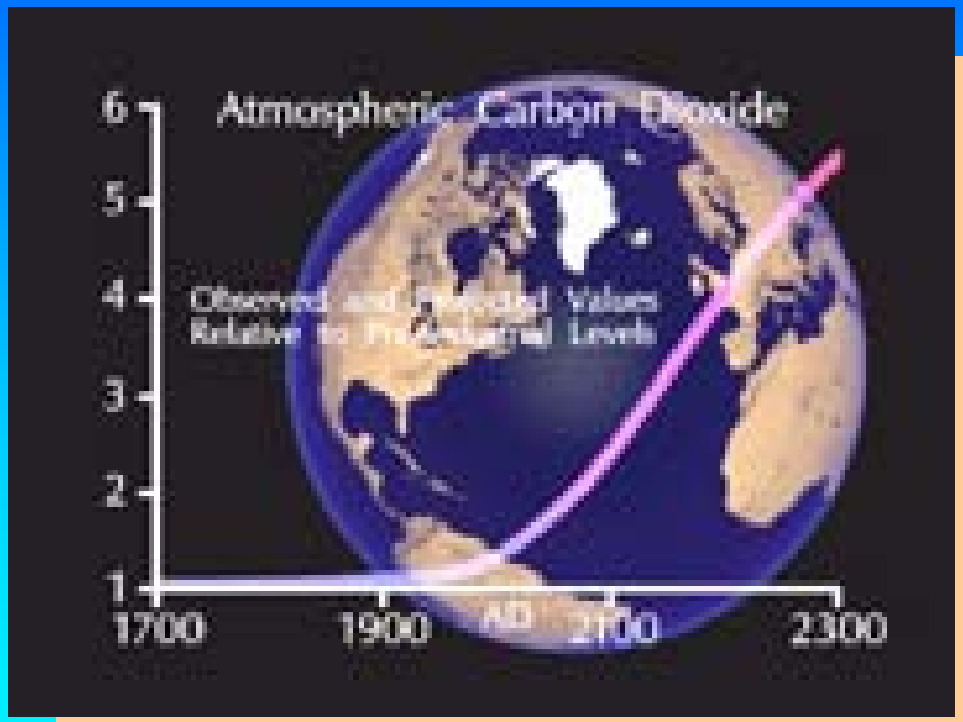




Health Impacts of Climate Change

- Temperature related morbidity and mortality
- Extreme weather events
- Health effects of air pollution
- Water- and food-borne contamination (enteric disease)
- Ozone depletion
- Vulnerable subpopulations
- Socioeconomic impacts

The Kyoto Protocol



- ***If*** **there is a problem, the Kyoto Protocol will not solve it.**
- **Global CO_2 *emissions* would have to fall *now* by 67% from current levels to stabilize CO_2 *concentrations* at twice pre-industrial levels (500 ppm) by 2100.**

Risk Assessment Research Priorities

- **Clarification of current health concerns (endocrine disruption, radiofrequency fields)**
- **Proactive approach to emerging health issues (emerging pathogens associated with global change)**
- **Exploration of low dose effects using sensitive molecular markers in population based studies**
- **Protection of susceptible subpopulations (children, the elderly)**
- **Interactions with other health determinants (genetic, social, health services)**

Risk Management Research Priorities

- **Principles of risk management decision making (precautionary principle, risk based)**
- **Multiple interventions (regulatory, economic, technological, advisory, community based)**
- **Evaluation risk management strategies (impact on population health, cost-effectiveness)**
- **Priority setting/resource allocation (global burden of disease, opportunities for effective intervention)**
- **Risk perception and risk acceptability (factors shaping risk perception, psychosocial acceptability of risk)**